

ABSTRACT OF THE DISCLOSURE

**[0049]** A system and method for efficiently and effectively simulating hardware-in-the-loop testing of a wireless communications network. The system and method employs an optical matrix-vector multiplier (MVM) for performing optical signal processing to simulate radio frequency (RF) signal propagation characteristics in a mobile wireless communications network. Specifically, the system and method employs an optical modulator, which is adapted to modulate optical energy with signal energy, such as radio frequency (RF) signal energy, propagating from a first group of transceivers of the network to form a vector of optical signals. The optical matrix-vector multiplier (MVM) receives the vector of optical signals, and has a matrix of optical channel weights which are modifiable in accordance with desired parameters to represent at least one parameter of the wireless network. The optical MVM is further adapted to output signals based on the received vector of optical signals and the optical channel weights. The system and method further employs a detector device, adapted to detect the output signals and to provide the output signals as an output vector of signals to a second group of transceivers of the network.

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